report of the newly constituted Limnological Commission, whose aim is to institute an exhaustive biological and physical investigation of the American lakes, on the plan already carried out with such success in Switzerland.

THE third instalment of Messrs. W. and G. S. West's "Alga-Flora of Yorkshire," reprinted from the *Transactions* of the Yorkshire Naturalists' Union, completes their list of the Conjugatæ (Desmidieæ) of the county, and enumerates the Siphoneæ, Protococcoideæ, and Cyanophyceæ (Myxophyceæ), with the commencement of the diatoms (Bacillariaceæ).

WE have received from Mr. J. H. Maiden, Government Botanist and Director of Botanic Garden, Sydney, copies of about thirty papers contributed by him during the years 1896–1901 to the *Agricultural Gazette* of New South Wales, and reprinted by the Department of Agriculture for the Colony, all relating to some point of interest or importance to farmers, gardeners, or fruit growers in the Colony.

IF sufficient support can be obtained, it is proposed to establish a new monthly journal, under the title *British Botanical Journal*, to afford a ready means of communication and discussion among British botanists. The contents will consist of articles and reviews, short paragraphs on important and striking current botanical matters, correspondence, short notices of books, original papers and notes, &c. Communications should be addressed to Mr. A. G. Tansley, University College, London, W.C., who will be the first editor.

Bulletin No. 28 of the U. S. Department of Agriculture, Division of Vegetable Physiology and Pathology, consists of an elaborate account, occupying more than 150 pages, of the cultural characters of the yellow flagellate bacteria *Pseudomonas Hyacinthi*, *P. campestris*, *P. Phaseoli*, and *P. Stewarti*, parasitic respectively on the hyacinth, on cruciferous plants, on leguminous plants, and on grasses, especially on maize. The favourable and unfavourable conditions for the growth of the parasites are treated of in great detail.

THE first part of a "Handbuch der vergleichenden und experimentellen Entwickelungslehre der Wirbeltiere," edited by Dr. Oscar Hertwig, has been received from the house of Gustav Fischer, Jena. The work promises to contain an exhaustive treatment of comparative and experimental embryology, and will be completed in about twenty parts at four-and-a-half marks each.

MM. GAUTHIER-VILLARS have commenced the publication of a complete "Cours d'Électricité," by Prof. H. Pellat. The work will be issued in three parts, the first of which, dealing with electrostatics, Ohm's law and thermoelectricity, has been received. The second volume will be concerned with electrodynamics, magnetism and induction, and the third with electrolysis, electro-capillarity and related questions. The part already received contains the course of work in electricity at the Sorbonne in 1898–1899; the second part will contain that carried on in 1899–1900, and the third will correspond to the course to be followed next year.

A NEW edition of "The Evolution of Sex," by Profs. Patrick Geddes and J. Arthur Thomson, reviewed in NATURE in 1890 (vol. xli. p. 51), has been published by Mr. Walter Scott. "In this revised edition," say the authors, "though many alterations and additions have been made, the original character of the work has been retained, and that notwithstanding the difficulty that the authors have in the past ten years been diverging biologically—the one towards a Neo-Lamarckian position, the other towards a Neo-Darwinian one. Yet they remain agreed on the main endeavour of the book, which is to set forth the fundamental unity underlying the Protean phenomena of sex and reproduction."

A NEW scientific periodical, the *Allgemeine Naturforscher-Zeitung*, edited by Dr. C. Wenck, commenced its career on October 2, and will appear twice weekly. The aim of the Editor is to publish scientific papers very shortly after they have been presented at meetings or congresses, and to make the journal reflect the chief characteristics of current scientific work. The first number contains two papers—one on anabiosis and the other on electrons—read at the recent Congress of Naturalists and Physicians at Hamburg, and a number of abstracts and reviews. In general character, the new periodical does not differ much from the old-established *Naturwissenschaftliche Wochenschrift*, which has just commenced a new series under the editorship of Prof. Potonié and Dr. F. Körber, and is now published by Mr. Gustav Fischer.

THE additions to the Zoological Society's Gardens during the past week include a Ring-tailed Lemur (*Lemur catta*) from Madagascar, presented by Mr. Chas. Rawsthorne; two Jays (*Garrulus glandarius*), British, presented by Mr. W. Radcliffe Saunders; three Common Snakes (*Tropidonotus natrix*), British; a Viperine Snake (*Tropidonotus viperinus*), European, presented by the Rev. H. A. Soames; a King Crab (*Limulus polyphemus*) from the North Atlantic Ocean, presented by Mr. Walker; two Arabian Baboons (*Cynocephalus hamadryas*, ♂ ♀) from Arabia, a Nilgiri Thar (*Hemitragus hylocrius*, ♂) from Southern India, four Getulian Ground Squirrels (*Xerus getulus*) from Morocco, four Great Wallaroos (*Macropus robustus*) from South Australia, an African Civet Cat (*Viverra civetta*) from South Africa, two Malayan Wrinkled Hornbills (*Rhytidoceros undulatus*) from Malacca, six Gigantic Salamanders (*Megalobatrachus maximus*) from Japan, four American Box Tortoises (*Cistudo carolina*) from North America, six Ceylonese Terrapins (*Nicoria trijuga*), nine Starred Tortoises (*Testudo elegans*) from India, a Lesueur's Water Lizard (*Physignathus lesueuri*) from Queensland, a Bearded Lizard (*Amphibolurus barbatus*) from Australia, deposited; a Rufous-necked Wallaby (*Macropus ruficollis*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

DIAMETER OF VENUS.—In the *Astronomical Journal* (vol. xxii. pp. 13–15), Mr. D. A. Drew gives the results of a series of measures of the diameter of Venus, made with the 24-inch refractor of the Lowell Observatory at Flagstaff, Arizona, in 1898. For the majority of the determinations a power of 165 was employed, together with an ocular diaphragm half a millimetre in diameter and an amber-coloured glass screen.

The tabulation and discussion of the reduced diameters indicates that there appears to be a peculiar variation in the planet's diameter, decidedly periodic, which may be due partly to the variable irradiation with the different phases and brilliancy of the body at different times.

SPECTRUM AND APPEARANCE OF NOVA PERSEI.—Herr E. von Gothard announces in *Astronomische Nachrichten* (Bd. 156, No. 3738) that he has photographed the spectrum of the Nova with a 10¼-inch reflector and objective prism, the result showing many of the characteristics of the peculiar structure seen in the spectra of planetary nebulæ. Bright lines are present at λλ 5007, 4861 ($H\beta$), 4341 ($H\gamma$), 4101 ($H\delta$), 3970 ($H\epsilon$), 3867, and a new line about λ 342. The brightest line in the whole spectrum is that at λ 3867, which is very prominent in planetary nebulæ.

He also alludes to the possibility of the aureole shown surrounding the star on photographs obtained with refracting telescopes being produced by the non-achromatic correction of these glasses for the extreme ultra-violet rays, which are so strongly developed in the Nova spectrum as to produce the chief part of the photographic action. This view of the question is also mentioned by Prof. Max Wolf in No. 3736; in

No. 3737 Skostinsky gives observations made at Pulkowa on the aureole and spectrum. The lines given are as follows :—

	λ		Intensity
1901 August 2	5010	Fairly bright line ..	10
	4960	Weak	2–3
	4861	Hβ	5
	4703	Bright, very broad...	6

ELEMENTS OF COMET 1901 I.—Mr. C. J. Merfield publishes the computed elements of the orbit of this comet in *Astronomische Nachrichten* (Bd. 156, No. 3738). The reductions are from observations made by Mr. J. Tebbutt on 1901 May 3, 11 and 19.

T = 1901 April 24·22532 G.M.T.

ω = 202° 48′ 46″
Ω = 109 46 23 } 1901·0
i = 131 2 35
log q = 9·3873832
log e = 9·9983750

THE GLASGOW MEETING OF THE BRITISH ASSOCIATION.

SECTION K.

BOTANY.

OPENING ADDRESS BY PROF. I. BAYLEY BALFOUR, LL.D. (GLASG.), F.R.S., PRESIDENT OF THE SECTION.

I SHOULD be wanting in my duty, alike to you and to our science, were I at the outset of our proceedings to pass over without notice the circumstances of environment in which we assemble to-day. In this, the first year of the century, our Section meets for the first time in Scotland, and finds itself housed in this magnificent Botanical Institute, which, through the energy and devotion of Prof. Bower, has been added this year to the equipment of Botany in this country. A few months ago the Institute was opened in the happiest auspices and with all the distinction that the presence of our veteran botanist, Sir Joseph Hooker, supported by two other ex-Presidents of the Royal Society—Lord Lister and Lord Kelvin—could give to the ceremony. I am sure we will cordially echo the words of goodwill that were spoken on that occasion. It must be to all of us a matter of congratulation that Botany has now provided for it in Glasgow this Institute both for its teaching and for the investigation of its inner secrets, and we may with confidence hope that the output of valuable additions to our knowledge of plant-life which has marked Glasgow during the tenure of office of its present distinguished Professor of Botany, and in which he himself has borne so large a share, will not only continue but will increase in a ratio not incommensurate with the facilities that are now provided.

The subject of my address is the group of Angiosperms. I will speak generally of some points in their construction from the point of view of their position as the dominant vegetation of the earth's surface at the present time, and more particularly of their relationship to water, as it is one which has much to do with their holding the position they now have. I wish, however, in the first place to refer to

The Communal Organisation of Angiosperms.

No fact of the construction of the plant-body that has been established within recent years is of greater importance than that of the continuity of protoplasm in pluricellular plants. As has been the case with so many epoch-making discoveries, we owe our first knowledge of this to the work of a British botanist. The demonstration by Gardiner of the existence of intercellular protoplasmic connections is the foundation of our modern notion of the constitution of the pluricellular plant-body and of the far-reaching conception of the communal organisation of Angiosperms and of all other Metaphyta.[1] It has settled, once and for all, phytomeric hypotheses. We now realise that in an Angiosperm the living plurinucleated protoplasm is spread over a skeletal support furnished by the cell-chambers of shoot and root. The energid of each living cell is connected with the adjacent energids by the protoplasmic threads piercing the separating cell-membrane. The protoplasm thus forms a continuous whole in the plant. According to their position in the organism the energids become devoted to the formation of special tissues for the building up of the various organs. Each one of them, however, whilst its actual destiny is ultimately determined by its relationships to the others, is, so long as its fate as a permanent element is not fixed, a potential protophyte, that is to say, it has within it all the capacities of the plant-organism to which it belongs.

Their construction out of this assemblage of protophytes—this colonial, or perhaps better communal, organisation—gives to Angiosperms their power of discarding effete and old parts of the plant-body without mutilation, of allowing these to pass out of the region of active life yet to remain without damage to the organism as part of the body, of renewing and replacing members as required. The response of the plant to the various horticultural operations of pruning, propagation by cuttings, and so forth is an outcome of this constitution. It is this which gives them the power of developing reproductive organs at any part of the plant-body, to cast them off when their work is done, and to renew them again and again. This dispersion of the reproductive capacity in the Angiosperm is one of the most striking of the properties it possesses, and is perhaps in no way better shown than in the development of stool-shoots. There the energids of the cambium, which normally produce the permanent tissue of wood and bark, and thereby add periodically to the girth of a tree, give origin when the relationships are changed by the cutting over of its bole to a callus from which stool-shoots arise as new growths, which may ultimately produce flower and reproductive organs.

Another outcome of this organisation of the Angiosperm is its power of extension and its longevity. It is potentially immortal. How far this expectation of life of a plant is realised in nature we have no evidence to show. Possibly we may presage the longest life in the case of perennial herbs. Trees and shrubs by their exposure in the air are liable to injury which must militate against long life, and yet cases of trees of great age are well known to you all.

It is this feature of the life of Angiosperms which marks them out sharply in contrast with the higher members of the animal kingdom. There we have individuality, and consequently comparatively short life. Let me emphasise this.

Of the Vegetable Kingdom and the Animal Kingdom.

The root-difference between plants and animals is one of nutrition. Plants are autotrophic, animals heterotrophic.

Whatever has been the origin of the two kingdoms, we must trace the differentiation of plants to their acquisition of chlorophyll as a medium for the absorption of the energy of the sun. The imprint of its operation is borne in the construction of all higher plants and distinguishes them from animals. The vegetative mechanism of the plant has been elaborated upon lines enabling it to obtain the materials of its food from gases and liquids which it absorbs from its environment. For the plant the primary requisite has been a sufficient surface of exposure in the medium whence it could obtain energy along with the gases and liquids of its food. To this end the fixed habit is an obvious advantage, for the question of bulk within the limits of nutrition becomes thereby not a matter of moment ; and an upward and a downward extension gives opportunity for the creation of a larger expanse of absorptive surface. Thus it has come about that the plant-organism has developed that polarity which finds expression in the profuse root-system and shoot-system with their localised growing points of the highest forms of to-day. That the communal organisation is well fitted to this mode of life requires no exposition.

The nutritive mechanism of animals, on the other hand, has become one for the ingestion of solids which it obtains by preying upon the bodies of plants and other animals. The exigencies of its feeding have compelled the adoption by the animal of the habit of locomotion, the development of an apparatus for the capture of its prey, and of an alimentary canal for its introduction to the body, for its digestion, and for the final ejection of the unused matter along with the waste of the body. This has

[1] Metaphyta and its antonym Protophyta are well-established names for groups of polyergic and monergic plants respectively. The recent appropriation of Metaphyta as a group name for Vasculares, *i.e.* plants derived from the second antithetic generation, and of Protophyta for Cellulares, *i.e.* plants derived from the first antithetic generation, is unfortunate.